

Flooding has been a major concern of many local residents, and a focus of the Village Board, for many years. Staff and I have recently put together information on the topic from past meetings, discussions, and memos, and I hope it may help to answer some questions.

Over the past several years, we have seen much more frequent major rainfalls. Monthly rainfall for the past 4 months has been substantially above average. For the month of August, the average rainfall is just over four inches...we had that in a 3 hour period last week. For the month of August, we are over 8 inches of rainfall. And this isn't just Brookfield...it is a regional issue. Also, understand that a rainfall of 4" over 3 hours is a lot different than a rainfall of 4" over 24 hours. We saw the effect of that several times over the past month with the closure of many major roadways, from First Avenue to the Eisenhower Expressway.

Combined sewer systems have both the sanitary and storm water flowing through the same lines. Our goal has been to separate these two systems as part of major street improvements. Our combined sewer system has an approximate capacity of being able to handle a rate of rainfall of 0.5"/hour. Any time we receive rainfall at a greater rate, the pipes will begin to surcharge.. that has happened four times in the past 8 weeks. Surcharged means when those pipes are completely full, and additional rainfall cannot enter the lines.

Depending on the volume of rain and over what period, basement flooding and street flooding can occur. It isn't just Brookfield that is experiencing these flooding problems, as all of the Cook County communities with combined sewer systems are experiencing similar flooding issues.

Since we can't change the amount of rain that falls, we have the following options.

- Reduce the rate of rain as it enters the combined sewer system (restrictors in catch basins, detention on commercial developments, disconnect downspouts). These improvements help keep the water out of the basements, but may increase the amount and duration of street flooding.
- Eliminate flow from the combined sewer system (install storm sewers). These improvements remove flow from the combined sewer system, but they are limited in capacity by the elevation of Salt Creek and the fact that they are typically designed to handle a 10-year storm event. They are also very costly.
- Protect the basements by installing check valves or overhead plumbing. These improvements help keep the water out of the basements, but may increase the amount and duration of street flooding. This is the most economical method of protecting basements from flooding damage due to sewer backups.

In regards to basement flooding, we need to look at if the water is coming up through the sewer line or entering through seepage. Sewer line backup can result if the village sewer is surcharged..it is completely filled. Water can also be coming in through seepage...around basement windows, or cracks in the foundation. Cracks in the

foundation may mean that a basement water sealing process is needed to alleviate this. Sometimes window wells are too low, allowing rainwater to flow over the top and into basements.

The village has taken many steps over the years to help reduce both basement and street flooding over recent years.

- We have started the Flood Mitigation Program. This program provides financial assistance for the installation of check valves and overhead plumbing improvements. This is one of the most economical ways of protecting basements. This was started in 2013. We had budgeted \$100,000 towards this program for this year, and increased that to \$200,000 several months ago. The program has been successful, but there remains a long list of residents wanting to participate. After discussing this with staff, I have asked the Board to support budgeting an additional \$200,000 towards this program by year end, with the intent of assisting the residents quicker. We are committed to this program and would like to move up the timetable for as many residents as we can.
- We have passed an ordinance that gutter downspouts need to be disconnected from the combined sewer system by the end of this year. This will reduce flow within the sewer system. Water cannot flow from street pavement if the lines are surcharged, or completely full, and this is one way to help reduce that. This is a relatively simple process of cutting the gutter near the bottom and attaching an elbow on the gutter end, directing rainfall away from the house. This is required to be done by Dec 31st.
- We have installed a substantial amount of separate storm sewers within our collector routes...streets such as Washington, Prairie, and Brookfield Avenue. This too reduces the amount of flow within the combined sewer system. Our investment into this has been over \$3.6 million.
- We also install restrictors on drainage structures during street improvements. A restrictor slows down the flow of water into the sewer, which can keep the sewers from filling up more quickly. Many times residents will call telling us that a sewer is clogged because there is water in the street, when actually this was part of the design. In many cases, it comes down to a choice of where we want to store the excess stormwater that the combined sewer system is not capable of transporting. Most people would agree that reducing basement flooding at the expense of an increased amount of duration of street flooding is a fair trade off.
- We have passed ordinances that require storm water detention on commercial properties. This is what you see next to Advance Auto. This is also what was required of the Brookfield Express Car Wash. At that time, some accused us of being too strict with our requirements, but this is essential if we are serious about dealing with flooding issues.

- We have installed the bio swale along Monroe as a new way of dealing with drainage.  
We have also installed permeable pavers west of the village hall parking lot as a way of controlling water flow into the creek.
- We are also experimenting with a "green alley" in the area behind Advance Auto. We hear many calls for paving alleys.. but eh question comes down to..where does that water go if the alley is paved? Into the already over taxed sewer system? We have to consider that going forward as we continue to get requests for this.
- Staff and the board have discussed the overall maintenance of our sewer system. What we can do is make sure that the system is working the best it can. Overall, our sewer system is in good operating condition, doing what it was designed to do at the time it was installed....in most cases 50-75 years ago. . The area has been built up tremendously since these sewers were built, and that can put a strain on the overall system at certain times. There are no major deteriorated areas requiring immediate attention.
- Programs such as televising all of our sewer system can be of some benefit, but there is a tradeoff. The last time all of the system was cleaned and televised was in the year 2000 at a cost of approx \$750,000. Staff estimates the cost today for the entire system to be over \$1 million. The engineer estimates 20-25 years as being the typical time in between televising that he sees in other towns, and we are starting to near that lower end. At the same time, each time we have done street improvements, the sewers are televised as part of the overall project. For instance, the work being done around Sunnyside and Oak and Rochester... those areas were televised, and several minor issues were found as the street work was being done. This topic was discussed during our capital planning meetings earlier in the year...not so much as a capital item but as a trade-off. Do we spend \$1 million to televise the sewers, or do we put that towards the actual work? As we begin our budget discussions next month, staff will be recommending committing a yearly dollar amount that will allow us to complete this over the next 4-5 years, and something the board will have to consider. Routine cleaning of the catch basins is important as well.
- We have applied for funding for a pump station at Prairie & Washington. The initial design of this is done, and staff is moving forward to the next stage. The project cost for this is estimated at \$1.9 million. We may know whether or not we have gotten this grant by fall of this year, and as we have progressed through initial stages of this, staff remains optimistic. Construction could begin in late 2015 or early 2016.
- What about the additional installation of storm sewers? This would reduce flow on the combined sewers. New storm sewers have greater capacity, but this capacity can be limited by the height of Salt Creek, where most of this flows to. Many of the current sewers are 10" sewers. Simply increasing a particular block or

area to a larger size may not improve the situation if the lines further down are not increased in size as well. And then the question is how big do we make our sewers, and at what cost? The costs are extremely high. It is estimated that to replace our combined sewers with separate storm sewers to be between 50 and 75 million dollars, plus the cost of street improvements on top of the sewers.

If we want to consider other types of improvements such as installation of additional storm sewers, this should be considered on a case by case basis and the severity of the flooding, cost of damages, etc. should be evaluated to ensure there is a reasonable benefit/cost ratio. There are other options such as creating detention ponds and letting the water back up into these areas. These are relatively expensive solutions and would likely require property acquisition. Much of this comes back to fitting these costs within our overall budget structure, and balancing all of the needs of our community.

There are many instances of rear yard flooding within our village. In many cases, rear lots were not graded to have positive drainage away from structures when they were built over the past century. Neighboring lots are at different heights, and in many cases the rear lots are lower than sidewalks or alleys and end up holding water. How does that water get out of there? Preferably, this would not end up with it going into the sewer system, or it will make that problem even worse. Grading may help, as can rain gardens, or French drain type installations...French drains are basically holding areas for water, a sort of dry well.

Staff currently is working on ordinances that would require rear yard storage of water in certain instances, while at the same time continuing to enforce the 40% required green space. This one gets a mixed reaction from some residents, as it can limit the size of the garage they put up, or the size of that new patio. But if we continue to cover over greenspace and not deal with where the rainfall goes, we make the problem worse.

While we have tried to be proactive in many areas regarding flooding, we cannot solve all of the problems. There are certain things we as a village can do, there are certain things individual residents can do. But I am hoping by explaining some of this, we can find additional ways where we can help to lessen the effects of the flooding on our community.

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